

Impact of CMS dijets in 5.02 TeV pPb and pp collisions on EPPS16 nuclear PDFs

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The CMS measurement of dijet pseudorapidity distributions in pPb versus pp collisions at 5.02 TeV [1] provides a direct constraint on nuclear gluon PDFs. We show that while the pPb pseudorapidity distributions have sizable free-proton PDF uncertainties, the ratios of the pPb and pp distributions at high average transverse momentum are practically insensitive to scale and free-proton PDF choices. We find the CMS data on pPb to pp ratios to be in good agreement with the EPPS16 nuclear modifications [2]. Using a non-quadratic extension of the Hessian PDF reweighting method [3], we study the impact of the high average transverse momentum data on the EPPS16 nuclear PDFs. Relative to EPPS16, we find stronger evidence for mid-x gluon antishadowing as well as indication for larger gluon shadowing at small x. The data are also able to further constrain the gluon PDF in the EMC region. Furthermore, we discuss complications in interpreting the low average transverse momentum data, arising from a relatively high transverse momentum cut of the leading jet.

[1] A. M. Sirunyan et al. [CMS Collaboration], arXiv:1805.04736 [hep-ex].

[2] K. J. Eskola, P. Paakkinen, H. Paukkunen and C. A. Salgado, Eur. Phys. J. C 77 (2017) no.3, 163.

[3] H. Paukkunen and P. Zurita, JHEP 1412 (2014) 100.

Summary

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